9. *Configuration of Divisors and Reflexive Sheaves*

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0. Let X be a connected complex manifold of dimension $\geqq 2$ and X^1 a reduced but *reducible* divisor of X. In this note, by using the Cech-stratification theoretical method in [7], we construct sheaves in the title from X^1. A main property of such sheaves is:

(*) They have X^1 as their determinantal divisor (cf. § 1). We see that the two highly important bundles on the projective spaces, Horrocks-Mumford and null correlation bundles (cf. [4] and [6]) are constructed in the above manner. We also form some other interesting sheaves which seem to belong to new classes (cf. § 2). This note is a report of our recent works, cf. [8]. Details will appear elsewhere.

1. **Construction.** Set $X^2=\bigcup_{i\neq j}(X_i^1\cap X_j^1)$ and $\mathring{X}=X-X^2$, where X_i^1 runs through all irreducible components of X^1. Then our sheaf, denoted by $\mathcal{E}$, is obtained as the direct image $i_*\mathring{\mathcal{E}}$ of a bundle $\mathring{\mathcal{E}}$ over $\mathring{X}$, with the injection $i:\mathring{X}\hookrightarrow X$. In order to form $\mathring{\mathcal{E}}$ we take (1) two open subsets N_0, N_1 of $\mathring{X}$ satisfying $N_0\cup N_1=\mathring{X}$ and (2) a non singular matrix $H\in \mathrm{GL}_r(\Gamma(N_0\cap N_1, \mathcal{O}))$, where $r=\operatorname{rank}\mathring{\mathcal{E}}$ and $\mathcal{O}$=structure sheaf of X. Then the bundle $\mathring{\mathcal{E}}$ is the one determined by H. We choose N_0, N_1 and H in such a manner that properties of X^1 reflect closely to them. More precisely we impose the following condition on $N_0, \cdots$:

(1. 1) $N_0=X-X^1$ and $N_1=\amalg_{i\in\Delta_m}N_{1,i}$, where $N_{1,i}$ is an open neighborhood of $\mathring{X}_i^1:=X_i^1-X^2$ in $\mathring{X}$. (Here $\Delta_m=\{1, \cdots, m\}$ with m=the number of the irreducible components of X^1.)

(1. 2) $H\in M_r(\Gamma(N_1, \mathcal{O}))$ and $(\det H)_0=\mathring{X}^1(:=\amalg_{i\in\Delta_m}\mathring{X}_i^1)$.

We see immediately that there are frames e^i of $\mathcal{E}_{|N_i}$, $i=0, 1$, satisfying $e^0=e^1H$ in $N_0\cap N_1$. This implies that $e^0\subset\Gamma(X, \mathcal{E})$ and that X^1 is the determinantal divisor of $\mathcal{E}$: $(\det e^0)_{|\mathring{X}}=\mathring{X}^1$.

2. **Examples.** Here we assume that $\dim X\geqq 3$. Also we assume that (1) there is a line bundle $\mathcal{L}$ over X and sections $s_i\in\Gamma(\mathcal{L})$ such that $X_i^1=(s_i)_0$ and (2) for each $I=\{i_1, \cdots, i_s\}$ satisfying $X_I:=\bigcap_{i\in I}X_i^1\neq\phi$, $\operatorname{codim}_X X_I=s$ and X_I is smooth.

2.1. First we consider two types of matrices $H\in M_2(\Gamma(N_1, \mathcal{O}))$ as follows. (In (2. 1, 2) below, $i\in\Delta_m$.)

(2. 1) $$H_{|N_{1,i}}=\begin{bmatrix}1 & t_i\otimes s_i/\prod_{j\in\Delta_m}s_j\\ 0 & s_i/s_{i+1}\end{bmatrix}$$ where t_i is an element of $\Gamma(\mathcal{L}^{\otimes(m-1)})$,

and